

FINAL DRAFT
Stormwater Management Manual for Eastern Washington
Hydrologic Modeling Issues
June 2003

Background

Reliable estimates of runoff volumes and flow rates are needed to design effective stormwater treatment and flow control facilities. Few field studies have been made of rainfall-runoff relationships in eastern Washington. In August 2002, the Eastern Washington Stormwater Manual Subcommittee established a Technical Advisory Work Group to evaluate modeling options, review feedback received on this topic during the public comment period, and make recommendations to the Subcommittee about what to include with regard to runoff modeling in the revised Manual. Ecology provided funding to hire another consultant to analyze hydrologic modeling issues raised by the Work Group and provide additional feedback and expertise in revising the draft Manual.

Choosing a design storm

Stormwater runoff estimates in eastern Washington are generally based on single-event hydrologic modeling. Custom storm distributions specific to eastern Washington were presented in the first Draft Stormwater Management Manual for Eastern Washington as part of an effort to improve hydrologic modeling and better represent typical conditions in eastern Washington. The custom storms have different characteristics compared with the generic SCS Type II storm distribution currently in use by many engineers in eastern Washington. The short-duration summer storm represents an intense thunderstorm (a typical summer event) and the long-duration storm consists of two consecutive longer, low intensity rainstorms separated by a short dry period (which might be expected in the winter or spring). Neither storm is the customary 24 hours in duration.

Questions were raised about the appropriateness of using commonly accepted SCS Curve Number modeling methods with the long-duration storm: the dry period in between caused confusion and concerns. The custom storms were reviewed and compared with generic SCS storms. The precipitation distribution and intensities of the SCS Type IA storm were similar to the second, larger low intensity rainstorm of the long-duration storm. The durations of the storms are also similar, except for Region 4 which has a longer storm. The consultant recommended using either the Type IA storm or only the second event in the custom long-duration storm with an adjusted antecedent moisture condition to account for the first event.

The short-duration summer storm can be used as is, without modification. The Manual Subcommittee also agreed that local jurisdictions should be allowed to develop and use their own custom design storms, provided that the methods used are peer-reviewed and the storms are based on local historical precipitation data.

Identifying a modeling approach

Several modeling approaches were considered. Because the primary goal of the Manual is to provide a consistent, reliable approach to designing stormwater facilities, the recommendation included in the Manual is a simple, widely known and accepted approach. Methods based on the SCS Curve Number approach meet these criteria. The Manual Subcommittee also agreed that project proponents should be allowed to use other modeling methods, provided that the approach used is peer-reviewed and supported by local data.